UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

SUBJECT: Review of Maryland Sand, Gravel and Stone Phase II hydrogeologic Investigation Report **DATE:** AUG 1 8 1988

FROM: Thomas Buntin, Hydrologist
Correction Action RCRA Enforcement Section (3HW11)

TO: Sharon Feldstein, Geologist
CERCLA Remedial Enforcement Section (3HW12)

Due to a very demanding schedule in the CARE Section, my review is not comprehensive. I have devoted four hours to review of this report, two hours for the generation of this memo, and one hour for typing of this memo.

The following comments constitute my review:

1. This Report discussed four distinct but hydraulically interconnected ground water flow zones or aquifers. The uppermost aquifer, as defined in the Technical Enforcement Guidance Document (TEGD), would include all four flow zones or aquifers. Therefore, any proposed abatement methodology must address all four ground water flow zones, not just the perched aquifer, i.e., the proposed methodology of abating ground water contamination via "collection" trenches is at best rudimentary.

2. Ground water monitoring wells screened in the deep unconsolidated flow zone indicate the presence of Cr, Pb, and Ba. However, the two ground water flow zones lying above the deep unconsolidated flow zone show no significant concentration of these three hazardous metals. Therefore, it is imperative that MSGS determine the source for these metals. For example, if MSGS maintains that these metals are coming from off-site then they must prove this assertion by drilling an upgradient well(s) on their property boundary that is screened in the deep unconsolidated flow zone.

3. This report stated that no metals of "significant" concentration were found in the bedrock aquifer, only volatiles were found in the bedrock aquifer. However, it was stated on page 5-10 of this report that the bedrock aquifer receives ground water from the overlying deep unconsolidated flow zone in the northeastern portion of the site, while

the bedrock aquifer discharges to the overlying deep unconsolidated aquifer in the southwestern portion of the site. Given that the metals Cr, Pb, and Ba exist at very significant levels in the deep unconsolidated aquifer and that volatiles are found in the bedrock aquifer, then why are no metals at significant levels detected in the bedrock aquifer and conversely why are no significant level of volatiles detected in the deep unconsolidated aquifer.

4. Cr is an essential nutrient in its trivalent state, while Cr is a proven carcinogen in its hexavalent state. Therefore, it is ablolutely imperative that all future analyses of Cr be for both trivalent and hexavalent Cr. Furthermore, the off-site well in which Cr was found (see page 5-12) must be analyzed for both trivalent and hexavalent Cr.

5. The stratigraphy at the MSGS site is very complex, as is the nature of sediments deposited by a meandering river. Consequently, the various flow zones or aquifers are highly anisotrophic. Therefore, hydraulic conductivities (K) have considerable variation both laterally and vertically. In such a complex setting, hydraulic conductivities are better determined by extensive pump testing (say 48 hours) than the slug tests used by MSGS. I recommend that K values be determined from pump testing, not slug tests.

6. Comments regarding Appendix K:

   A. Is the equation for hydraulic conductivity on page K-2 empirically derived? If so, for what type of lithology is the equation applicable, e.g., clay, silt, sand, gravel, etc.

   B. Table 5-3 provided values of K for various types of tests, i.e., rising head, falling head, and back pressure. According to table 5-3, the back pressure test gives consistently low values of K when compared to the rising or falling head test for the same lithology. I feel the back pressure test is the least "accurate" of the three tests and therefore should not be used in any calculation for ground water velocity. Furthermore, the back pressure test is generally applicable to finegrained soils that are not fully saturated. I am not sure what a fine-grained soil is (although I do not believe it is a clay). Also, the report does not give the degree of saturation of the samples tested, it only gives the % by

weight of water in the soil, which is not the same as the % of saturation. Therefore, I question the validity of applying this test at the MSGS site.

7. Comments regarding Table 5-12:

   A. The designation for change in head is dh, not dl as in the report.

   B. dl and dh are determined from two wells. It is unclear as to how dl and dh were determined. For example, D&M-05 is 1,600 feet from what? Also, the head in D&M-05 is 14 feet different from what?

   C. The values of hydraulic conductivity may be misleading, as discussed in my comment #6.

   D. Based upon comments A, B, and C above, I believe the calculated travel times of groundwater to the facilities boundary may be significantly inaccurate.

cc: Laura Boornazian
Peter Schaul
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